

(Appendix B, which is enclosed herewith, shows how currently pending Claims 1 and 21 were amended to produce amended Claims 1 and 21 in Appendix A. In Appendix B, the portions being added are underlined; and the portions being deleted are enclosed in braces.)

Please add new Claims 23-26, which are set forth in the enclosed Appendix C.

IN THE ABSTRACT

Please replace the currently pending Abstract with the new Abstract that is set forth in the enclosed Appendix D.

REMARKS

This response is being submitted after the shortened three-month statutory period set for responding to the outstanding Office Action. Therefore, a petition and a fee for an extension of time are enclosed herewith.

Hereinafter, the claims that are pending prior to the entry of the amendments in this response are called "currently pending claims." This response cancels currently pending Claim 22, amends currently pending Claims 1 and 21, and adds new Claims 23-26. Upon amendment, the above-identified U.S. patent application will have two independent claims (amended Claims 1 and 21) and 23 total claims (amended Claim 1, currently pending Claims 2-8, 10-18, and

20, amended Claim 21, and new Claims 23-26). The Applicants previously paid for up to three independent claims and 20 total claims. Therefore, a fee is due for three excess total claims; and a check for this fee is enclosed herewith.

Support for amending the formulas in currently pending Claim 1 can be found in, *inter alia*, originally filed Claim 1 and in the pentagonal formulas on pages 6 and 7 of the specification because these formulas show multiple Q's (with their associated moieties) bridging the two L groups. Support for amending currently pending Claim 21 can be found in, *inter alia*, originally filed Claim 1.

Support for new Claim 23 can be found in, *inter alia*, originally filed Claim 6, which was renumbered as Claim 5. Support for new Claims 24 and 25 can be found in, *inter alia*, originally filed Claim 1.

Support for new Claim 26 can be found in, *inter alia*, the sentence bridging pages 1 and 2 of the specification and lines 20-26 on page 42 of the specification.

In the outstanding Office Action, the Examiner objects to the currently pending Abstract. This objection is now moot and should be withdrawn because the new Abstract, which is set forth in Appendix D, is unobjectionable. Support for the new Abstract can be found in, *inter alia*, the originally filed Abstract.

Next, in the outstanding Office Action, the Examiner rejects currently pending Claims 1-7 and 10-18 under 35 U.S.C. § 112, first paragraph because currently pending Claim 1 allegedly is not supported by the originally filed application. This rejection is now moot and should be withdrawn because, as described above, amended Claim 1 is supported by the originally filed application.

In the outstanding Office Action, the Examiner then rejects currently pending Claims 1 and 21 for allegedly being indefinite. The Applicants respectfully traverse this rejection. Furthermore, this rejection is now moot and should be withdrawn because amended Claims 1 and 21 are not indefinite.

In the outstanding Office Action, the Examiner next rejects currently pending Claims 1-7, 10-19, and 21 for allegedly being anticipated by or obvious in view of European Patent Document No. 0 802 203 (hereinafter referred to as the "Hidalgo-Llinas document"); and the Examiner rejects currently pending Claims 1-7, 10-19, and 21 for allegedly being obvious over European Patent Document No. 0 372 414 (hereinafter referred to as the "Antberg EPO document") in view of European Patent Document No. 0 206 794 (hereinafter referred to as the "Welborn document"). The Applicants respectfully traverse these rejections. Furthermore, these rejections are now moot and should be withdrawn because the prior art does not teach or suggest amended Claim 1, currently pending Claims 2-8, 10-18, and 20, amended Claim 21, and new Claims 23-26.

In view of the foregoing, favorable reconsideration of the amended application is respectfully requested. It is submitted that the claims of record are in condition for allowance. Allowance of the claims at an early date is solicited.

This response cancels currently pending Claim 22, amends currently pending Claims 1 and 21, and adds new Claims 23-26. The cancellations, amendments, and additions that are described in the preceding sentence were done to more fully claim the invention and were not done to overcome the prior art, to overcome rejections under 35 U.S.C. § 112, or to overcome any other rejections or objections. The cancellations, amendments, and additions that are described in the first sentence of this paragraph shall not be

considered necessary to overcome the prior art, shall not be considered necessary to overcome rejections under 35 U.S.C. § 112, and shall not be considered necessary to overcome any other rejections or objections.

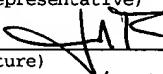
The Applicants reserve the right to seek protection for any unclaimed subject matter either subsequently in the prosecution of the present case or in a divisional or continuation application.

The Commissioner is authorized to charge any additional fees which may be required or credit overpayment to Deposit Account No. 12-0415. In particular, if this response is not timely filed, then the Commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 C.F.R. § 1.136(a) requesting an extension of time of the number of months necessary to make this response timely filed; and the petition fee due in connection therewith may be charged to Deposit Account No. 12-0415.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first-class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C., 20231 on

October 3, 2002  
(Date of Deposit)

JOHN PALMER  
(Name of Applicant, Assignee  
or Registered Representative)

  
(Signature)

10-3-02  
(Date)

Respectfully submitted,

  
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Encl.: Appendices A, B, C, and D

APPENDIX A

Re: U.S. Patent Application No. 09/299,539

Applicant: Antonio Munoz-Escalona Lafuente, et al.

Title: "Catalytic Systems for the . . ."

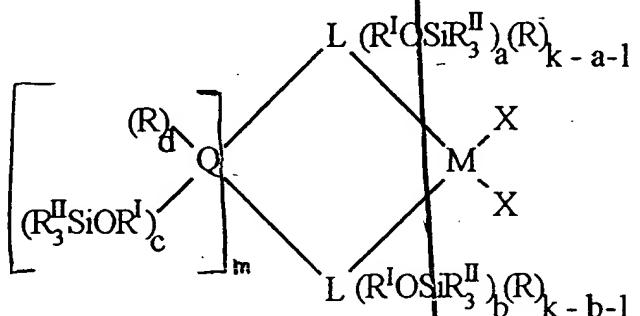
Our Ref.: 617072-2/JP/B-3643

Please replace currently pending Claims 1 and 21 with amended  
Claims 1 and 21, which are set forth below.

*for JPP*  
Claim 1. (amended four times) A heterogeneous catalytic composition obtained by reacting a porous inorganic support with an alumoxane and subsequently supporting at least one metallocene compound thereon, wherein the metallocene compound is defined by formula I, II, or III:



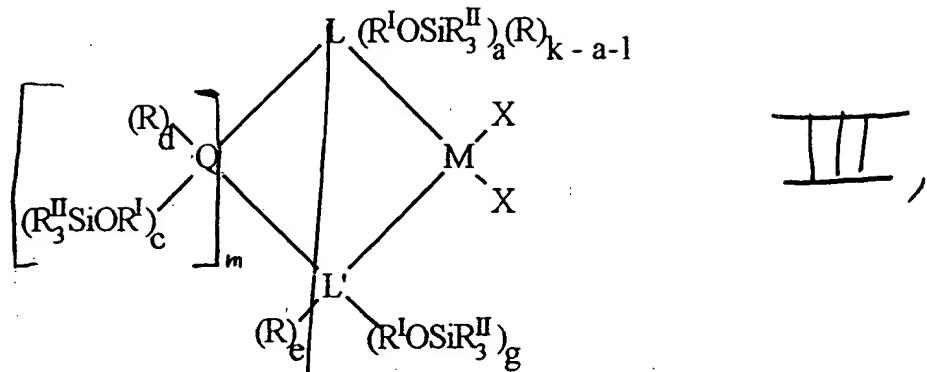
I,



II, or

APPENDIX A

*J. J. Cork*



wherein:

the **L** groups are equal to or different from each other, wherein each **L** is selected from the group consisting of cyclopentadienyl, indenyl, tetrahydroindenyl, fluorenyl, octahydrofluorenyl, and benzoindenyl;

each **R** is independently hydrogen, linear or branched C<sub>1</sub>-C<sub>20</sub> alkyl, linear or branched C<sub>3</sub>-C<sub>20</sub> cycloalkyl, linear or branched C<sub>6</sub>-C<sub>20</sub> aryl, linear or branched C<sub>3</sub>-C<sub>20</sub> alkenyl, linear or branched C<sub>7</sub>-C<sub>20</sub> arylalkyl, linear or branched C<sub>7</sub>-C<sub>20</sub> alkylaryl, linear or branched C<sub>8</sub>-C<sub>20</sub> arylalkenyl, or a group SiR<sup>II</sup><sub>3</sub>, wherein the C<sub>1</sub>-C<sub>20</sub> alkyl, the C<sub>3</sub>-C<sub>20</sub> cycloalkyl, the C<sub>6</sub>-C<sub>20</sub> aryl, the C<sub>3</sub>-C<sub>20</sub> alkenyl, the C<sub>7</sub>-C<sub>20</sub> arylalkyl, the C<sub>7</sub>-C<sub>20</sub> alkylaryl, and the C<sub>8</sub>-C<sub>20</sub> arylalkenyl are optionally substituted with 1 to 10 halogen atoms;

the **R<sup>I</sup>** groups are equal to or different from each other, wherein

## APPENDIX A

each  $R^I$  is a divalent aliphatic or aromatic hydrocarbon group containing from 1 to 20 carbon atoms, optionally containing from 1 to 5 heteroatoms of groups 14 to 16 of the Periodic Table of the Elements, and optionally containing boron;

each  $R^{II}$  is independently linear or branched  $C_1-C_{20}$  alkyl, linear or branched  $C_3-C_{20}$  cycloalkyl, linear or branched  $C_6-C_{20}$  aryl, linear or branched  $C_3-C_{20}$  alkenyl, linear or branched  $C_7-C_{20}$  arylalkyl, linear or branched  $C_8-C_{20}$  arylalkenyl, or linear or branched  $C_7-C_{20}$  alkylaryl;

each  $Q$  is independently B, C, Si, Ge, or Sn;

$M$  is a lanthanide, an actinide, or a metal of group 3, 4, or 10 of the Periodic Table of the Elements, and  $M$  has a valence;

each  $X$  is independently hydrogen, chlorine, bromine,  $OR^{II}$ ,  $NR^{II}{}_2$ ,  $C_1-C_{20}$  alkyl, or  $C_6-C_{20}$  aryl;

$L'$  is N or O;

when  $L$  is cyclopentadienyl,  $k$  is equal to 5; when  $L$  is indenyl,  $k$  is equal to 7; when  $L$  is fluorenyl or benzoindenyl,  $k$  is equal to 9; when  $L$  is tetrahydroindenyl,  $k$  is equal to 11; and when  $L$  is octahydrofluorenyl,  $k$  is equal to 17;

$z$  is equal to 0, 1, or 2;

$x$  is equal to 1, 2, or 3;

$y$  is equal to 1, 2, or 3;

$x + y + z$  is equal to the valence of  $M$ ;

$m$  is equal to 1, 2, 3 or 4;

$a$  is an integer whose value ranges from 0 to  $k-1$ ;

$b$  is an integer whose value ranges from 0 to  $k-1$ ;

$f$  is an integer whose value ranges from 1 to  $k$ ;

$g$  is equal to 0 or 1;

$c$  is equal to 0 or 1;

$e$  is equal to 0 or 1;

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*b1*  
*cont'*

$a + b + c$  is at least 1;

$a + g + c$  is at least 1;

$d$  is equal to 0, 1, or 2;

when  $Q$  is B, then  $c + d = 1$ ;

when  $Q$  is C, Si, Ge, or Sn, then  $c + d = 2$ ;

when  $L'$  is N, then  $g + e = 1$ ; and

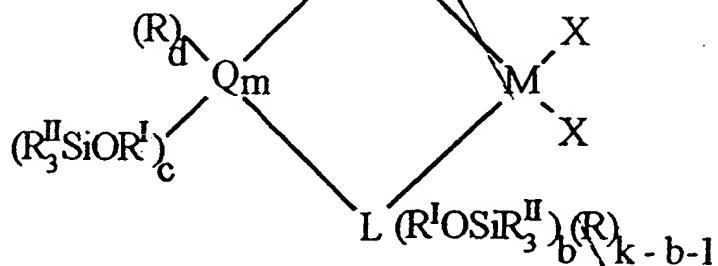
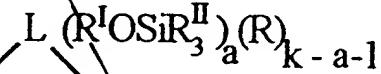
when  $L'$  is O, then  $g = 0$  and  $e = 0$ .

*b2*

Claim 21. (amended once) A heterogeneous catalytic system obtained by reacting a porous inorganic support with an alumoxane and subsequently supporting at least one metallocene compound thereon, wherein the metallocene compound is defined by formula I, II, or III:

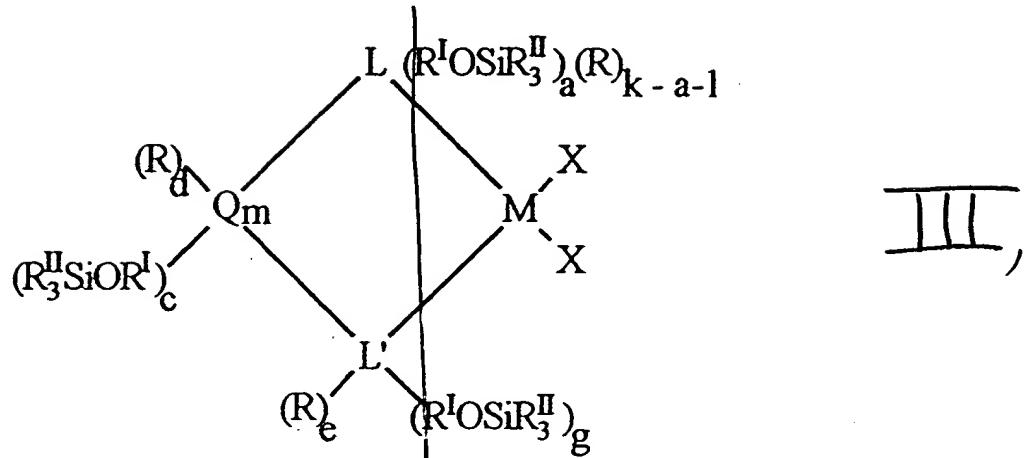


I,



II, or

APPENDIX A



2  
Cont

wherein:

the **L** groups are equal to or different from each other, wherein each **L** is selected from the group consisting of cyclopentadienyl, indenyl, tetrahydroindenyl, fluorenyl, octahydrofluorenyl, and benzoindenyl;

each **R** is independently hydrogen, linear or branched  $C_1-C_{20}$  alkyl, linear or branched  $C_3-C_{20}$  cycloalkyl, linear or branched  $C_6-C_{20}$  aryl, linear or branched  $C_3-C_{20}$  alkenyl, linear or branched  $C_7-C_{20}$  arylalkyl, linear or branched  $C_7-C_{20}$  alkylaryl, linear or branched  $C_8-C_{20}$  arylalkenyl, or a group  $\text{SiR}^{\text{II}}_3$ , wherein the  $C_1-C_{20}$  alkyl, the  $C_3-C_{20}$  cycloalkyl, the  $C_6-C_{20}$  aryl, the  $C_3-C_{20}$  alkenyl, the  $C_7-C_{20}$  arylalkyl, the  $C_7-C_{20}$  alkylaryl, and the  $C_8-C_{20}$  arylalkenyl are optionally substituted with 1 to 10 halogen atoms;

the **R<sup>I</sup>** groups are equal to or different from each other, wherein

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each  $\mathbf{R}^I$  is a divalent aliphatic or aromatic hydrocarbon group containing from 1 to 20 carbon atoms, optionally containing from 1 to 5 heteroatoms of groups 14 to 16 of the Periodic Table of the Elements, and optionally containing boron;

each  $\mathbf{R}^{II}$  is independently linear or branched  $C_1-C_{20}$  alkyl, linear or branched  $C_3-C_{20}$  cycloalkyl, linear or branched  $C_6-C_{20}$  aryl, linear or branched  $C_3-C_{20}$  alkenyl, linear or branched  $C_7-C_{20}$  arylalkyl, linear or branched  $C_8-C_{20}$  arylalkenyl, or linear or branched  $C_7-C_{20}$  alkylaryl;

each  $\mathbf{Q}$  is independently B, C, Si, Ge, or Sn;

$\mathbf{M}$  is a lanthanide, an actinide, or a metal of group 3, 4, or 10 of the Periodic Table of the Elements, and  $\mathbf{M}$  has a valence;

each  $\mathbf{x}$  is independently hydrogen, chlorine, bromine,  $OR^{II}$ ,  $NR^{II}{}_2$ ,  $C_1-C_{20}$  alkyl, or  $C_6-C_{20}$  aryl;

$\mathbf{L}'$  is N or O;

when  $\mathbf{L}$  is cyclopentadienyl,  $\mathbf{k}$  is equal to 5; when  $\mathbf{L}$  is indenyl,  $\mathbf{k}$  is equal to 7; when  $\mathbf{L}$  is fluorenyl or benzoindenyl,  $\mathbf{k}$  is equal to 9; when  $\mathbf{L}$  is tetrahydroindenyl,  $\mathbf{k}$  is equal to 11; and when  $\mathbf{L}$  is octahydrofluorenyl,  $\mathbf{k}$  is equal to 17;

$\mathbf{z}$  is equal to 0, 1, or 2;

$\mathbf{x}$  is equal to 1, 2, or 3;

$\mathbf{y}$  is equal to 1, 2, or 3;

$\mathbf{x} + \mathbf{y} + \mathbf{z}$  is equal to the valence of  $\mathbf{M}$ ;

$\mathbf{m}$  is equal to 1, 2, 3 or 4;

$\mathbf{a}$  is an integer whose value ranges from 0 to  $\mathbf{k}-1$ ;

$\mathbf{b}$  is an integer whose value ranges from 0 to  $\mathbf{k}-1$ ;

$\mathbf{f}$  is an integer whose value ranges from 1 to  $\mathbf{k}$ ;

$\mathbf{g}$  is equal to 0 or 1;

$\mathbf{c}$  is equal to 0 or 1;

$\mathbf{e}$  is equal to 0 or 1;

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$a + b + c$  is at least 1;

$a + g + c$  is at least 1;

$d$  is equal to 0, 1, or 2;

when  $Q$  is B, then  $c + d = 1$ ;

when  $Q$  is C, Si, Ge, or Sn, then  $c + d = 2$ ;

when  $L'$  is N, then  $g + e = 1$ ; and

when  $L'$  is O, then  $g = 0$  and  $e = 0$ .

APPENDIX B

Re: U.S. Patent Application No. 09/299,539

Applicant: Antonio Munoz-Escalona Lafuente, et al.

Title: "Catalytic Systems for the . . ."

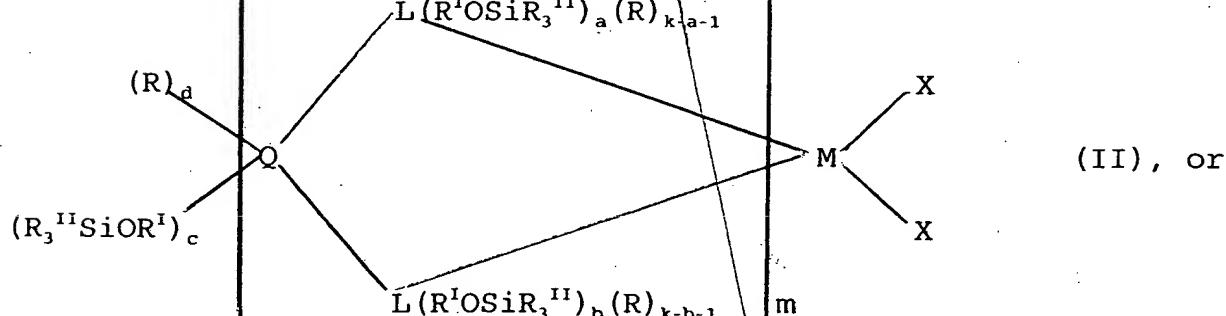
Our Ref.: 617072-2/JP/B-3643

Please amend Claims 1 and 21 as indicated below, wherein the portions being added are underlined and the portions being deleted are enclosed in braces.

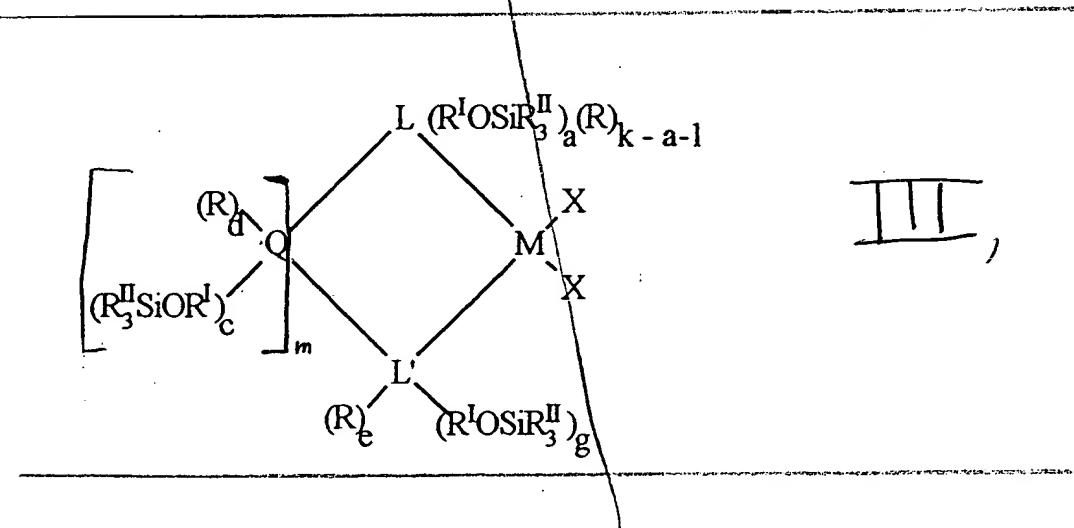
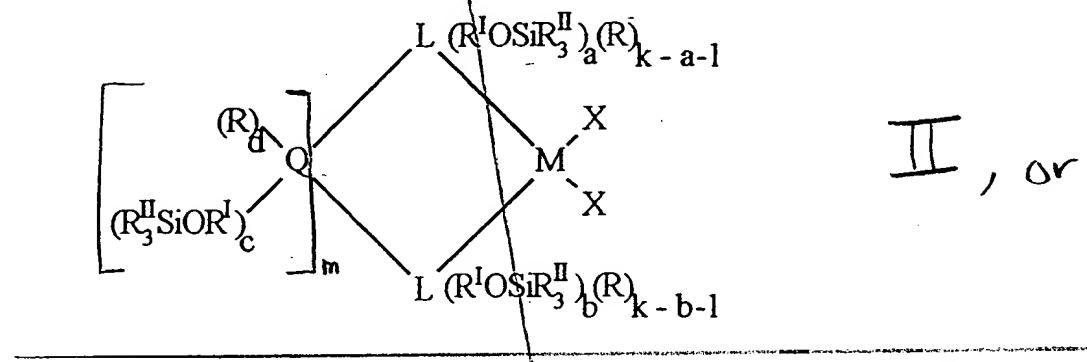
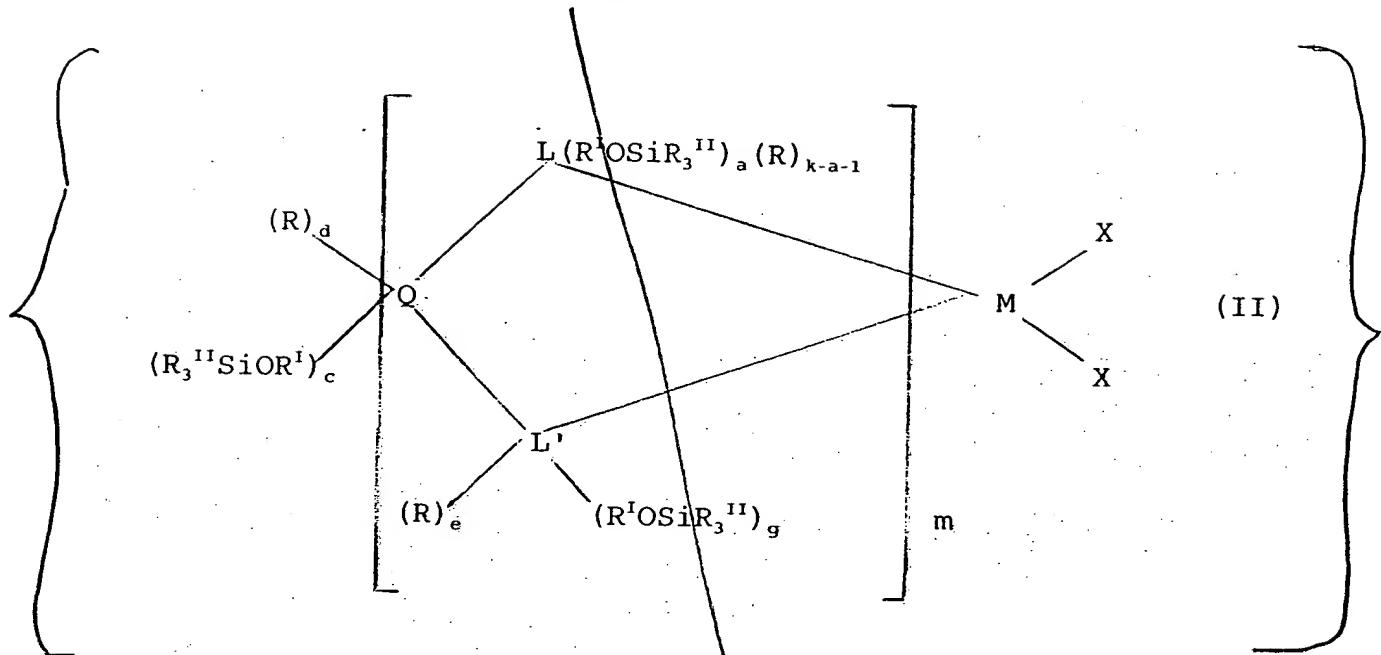
Claim 1. (amended four times) A heterogeneous catalytic composition obtained by reacting a porous inorganic support with an alumoxane and subsequently supporting at least one metallocene compound thereon, wherein the metallocene compound is defined by formula I, II, or III:



I,



APPENDIX B



APPENDIX B

wherein:

the **L** groups are equal to or different from each other, wherein each **L** is selected from the group consisting of cyclopentadienyl, indenyl, tetrahydroindenyl, fluorenyl, octahydrofluorenyl, and benzoindenyl;

each **R** is independently hydrogen, linear or branched  $C_1$ - $C_{20}$  alkyl, linear or branched  $C_3$ - $C_{20}$  cycloalkyl, linear or branched  $C_6$ - $C_{20}$  aryl, linear or branched  $C_3$ - $C_{20}$  alkenyl, linear or branched  $C_7$ - $C_{20}$  arylalkyl, linear or branched  $C_7$ - $C_{20}$  alkylaryl, linear or branched  $C_8$ - $C_{20}$  arylalkenyl, or a group  $SiR^{II}_3$ , wherein the  $C_1$ - $C_{20}$  alkyl, the  $C_3$ - $C_{20}$  cycloalkyl, the  $C_6$ - $C_{20}$  aryl, the  $C_3$ - $C_{20}$  alkenyl, the  $C_7$ - $C_{20}$  arylalkyl, the  $C_7$ - $C_{20}$  alkylaryl, and the  $C_8$ - $C_{20}$  arylalkenyl are optionally substituted with 1 to 10 halogen atoms;

the **R<sup>I</sup>** groups are equal to or different from each other, wherein each **R<sup>I</sup>** is a divalent aliphatic or aromatic hydrocarbon group containing from 1 to 20 carbon atoms, optionally containing from 1 to 5 heteroatoms of groups 14 to 16 of the Periodic Table of the Elements, and optionally containing boron;

each **R<sup>II</sup>** is independently linear or branched  $C_1$ - $C_{20}$  alkyl, linear or branched  $C_3$ - $C_{20}$  cycloalkyl, linear or branched  $C_6$ - $C_{20}$  aryl, linear or branched  $C_3$ - $C_{20}$  alkenyl, linear or branched  $C_7$ - $C_{20}$  arylalkyl, linear or branched  $C_8$ - $C_{20}$  arylalkenyl, or linear or branched  $C_7$ - $C_{20}$  alkylaryl;

each **Q** is independently B, C, Si, Ge, or Sn;

**M** is a lanthanide, an actinide, or a metal of group 3, 4, or 10 of the Periodic Table of the Elements, and **M** has a valence;

each **X** is independently hydrogen, chlorine, bromine,  $OR^{II}$ ,  $NR^{II}_2$ ,

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$C_1-C_{20}$  alkyl, or  $C_6-C_{20}$  aryl;

$L'$  is N or O;

when  $L$  is cyclopentadienyl,  $k$  is equal to 5; when  $L$  is indenyl,  $k$  is equal to 7; when  $L$  is fluorenyl or benzoindenyl,  $k$  is equal to 9; when  $L$  is tetrahydroindenyl,  $k$  is equal to 11; and when  $L$  is octahydrofluorenyl,  $k$  is equal to 17;

$z$  is equal to 0, 1, or 2;

$x$  is equal to 1, 2, or 3;

$y$  is equal to 1, 2, or 3;

$x + y + z$  is equal to the valence of  $M$ ;

$m$  is equal to 1, 2, 3 or 4;

$a$  is an integer whose value ranges from 0 to  $k-1$ ;

$b$  is an integer whose value ranges from 0 to  $k-1$ ;

$f$  is an integer whose value ranges from 1 to  $k$ ;

$g$  is equal to 0 {to} or 1;

$c$  is equal to 0 or 1;

$e$  is equal to 0 or 1;

$a + b + c$  is at least 1;

$a + g + c$  is at least 1;

$d$  is equal to 0, 1, or 2;

when  $Q$  is B, then  $c + d = 1$ ;

when  $Q$  is C, Si, Ge, or Sn, then  $c + d = 2$ ;

when  $L'$  is N, then  $g + e = 1$ ; and

when  $L'$  is O, then  $g = 0$  and  $e = 0$ .

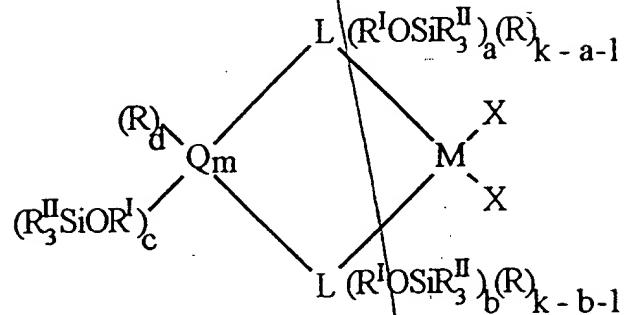
Claim 21. (amended once) A heterogeneous catalytic system obtained by reacting a porous inorganic support with an alumoxane and subsequently supporting at least one metallocene compound thereon, wherein the metallocene compound is defined by formula I,

APPENDIX B

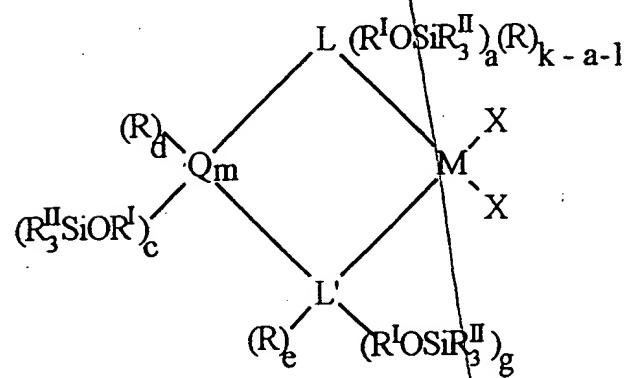
II, or III:



I,



II, or



III,

wherein:

the L groups are equal to or different from each other, wherein each L is selected from the group consisting of cyclopentadienyl,

APPENDIX B

indenyl, tetrahydroindenyl, fluorenyl, octahydrofluorenyl, and benzoindenyl;

each **R** is independently hydrogen, linear or branched  $C_1-C_{20}$  alkyl, linear or branched  $C_3-C_{20}$  cycloalkyl, linear or branched  $C_6-C_{20}$  aryl, linear or branched  $C_3-C_{20}$  alkenyl, linear or branched  $C_7-C_{20}$  arylalkyl, linear or branched  $C_7-C_{20}$  alkylaryl, linear or branched  $C_8-C_{20}$  arylalkenyl, or a group  $SiR^{II}_3$ , wherein the  $C_1-C_{20}$  alkyl, the  $C_3-C_{20}$  cycloalkyl, the  $C_6-C_{20}$  aryl, the  $C_3-C_{20}$  alkenyl, the  $C_7-C_{20}$  arylalkyl, the  $C_7-C_{20}$  alkylaryl, and the  $C_8-C_{20}$  arylalkenyl are optionally substituted with 1 to 10 halogen atoms;

the **R<sup>I</sup>** groups are equal to or different from each other, wherein each **R<sup>I</sup>** is a divalent aliphatic or aromatic hydrocarbon group containing from 1 to 20 carbon atoms, optionally containing from 1 to 5 heteroatoms of groups 14 to 16 of the Periodic Table of the Elements, and optionally containing boron;

each **R<sup>II</sup>** is independently linear or branched  $C_1-C_{20}$  alkyl, linear or branched  $C_3-C_{20}$  cycloalkyl, linear or branched  $C_6-C_{20}$  aryl, linear or branched  $C_3-C_{20}$  alkenyl, linear or branched  $C_7-C_{20}$  arylalkyl, linear or branched  $C_8-C_{20}$  arylalkenyl, or linear or branched  $C_7-C_{20}$  alkylaryl;

each **Q** is independently B, C, Si, Ge, or Sn;

**M** is a lanthanide, an actinide, or a metal of group 3, 4, or 10 of the Periodic Table of the Elements, and **M** has a valence;

each **X** is independently hydrogen, chlorine, bromine,  $OR^{II}$ ,  $NR^{II}_2$ ,  $C_1-C_{20}$  alkyl, or  $C_6-C_{20}$  aryl;

**L'** is N or O;

when **L** is cyclopentadienyl, **k** is equal to 5; when **L** is indenyl, **k**

## APPENDIX B

is equal to 7; when **L** is fluorenyl or benzoindenyl, **k** is equal to 9; when **L** is tetrahydroindenyl, **k** is equal to 11; and when **L** is octahydrofluorenyl, **k** is equal to 17;  
**z** is equal to 0, 1, or 2;  
**x** is equal to 1, 2, or 3;  
**y** is equal to 1, 2, or 3;  
**x** + **y** + **z** is equal to the valence of **M**;  
**m** is equal to 1, 2, 3 or 4;  
**a** is an integer whose value ranges from 0 to **k**-1;  
**b** is an integer whose value ranges from 0 to **k**-1;  
**f** is an integer whose value ranges from 1 to **k**;  
**g** is equal to 0 {to} or 1;  
**c** is equal to 0 or 1;  
**e** is equal to 0 or 1;  
**a** + **b** + **c** is at least 1;  
**a** + **g** + **c** is at least 1;  
**d** is equal to 0, 1, or 2;  
when **Q** is B, then **c** + **d** = 1;  
when **Q** is C, Si, Ge, or Sn, then **c** + **d** = 2;  
when **L'** is N, then **g** + **e** = 1; and  
when **L'** is O, then **g** = 0 and **e** = 0.

APPENDIX C

Re: U.S. Patent Application No. 09/299,539

Applicant: Antonio Munoz-Escalona Lafuente, et al.

Title: "Catalytic Systems for the . . ."

Our Ref.: 617072-2/JP/B-3643

Please add the following new claims.

23. The heterogeneous catalytic composition as claimed in Claim 2, wherein the inorganic support is selected from the group consisting of silica, alumina, silica alumina, aluminum phosphates, and mixtures thereof.

24. The heterogeneous catalytic composition as claimed in Claim 1, wherein m is equal to 1 or 2.

25. The heterogeneous catalytic system as claimed in Claim 21, wherein m is equal to 1 or 2.

26. The heterogeneous catalytic composition as claimed in Claim 1, wherein after the porous inorganic support reacts with the alumoxane, the alumoxane reacts with one of the  $-R^1OSiR^{II}^3$  groups of the metallocene compound to form the heterogeneous catalytic composition.

## APPENDIX D

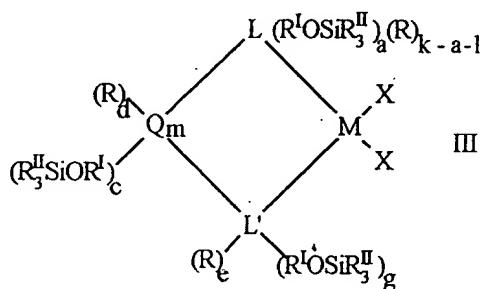
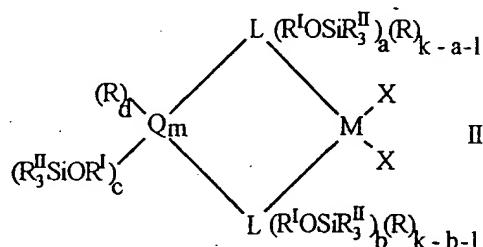
Re: U.S. Patent Application No. 09/299,539

Applicant: Antonio Munoz-Escalona Lafuente, et al.

Title: "Catalytic Systems for the . . ."

Our Ref.: 617072-2/JP/B-3643

The invention relates to heterogeneous catalytic systems obtainable by reacting a porous inorganic support with an alumoxane and subsequently supporting at least one metallocene compound thereon, characterized in that the metallocene compound is defined by the following general formulas:



wherein the metallocene compound contains at least one  $-R^I OSiR_3^{II}$  group.